

**REMARKS**

Reconsideration of the above-identified application in view of the foregoing amendments and following remarks is respectfully requested.

A. Claim Status / Explanation of Amendments

Claims 1-4, 7, and 15-21 are pending of which claims 1-4, 7, and 15-20 were rejected whereas claim 21 was constructively withdrawn from consideration as being directed to a non-elected invention. Applicants reserve the right to pursue the withdrawn claim in a divisional application. As to the merits, the rejection of claims 1-4, 7, and 15-20 pursuant to 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,500,537 to Araki, et al. ("Araki") in view of Japanese Patent No. JP 01255798 to Kobayashi, et al. ("Kobayashi") was maintained. [7/16/08 Office Action, p. 3].

By this paper claims 1-2, 4, 15-16, and 20 are amended such that "titanium oxide powder" is changed to "titanium oxide powder particles" throughout. Support for the amendment to these claims may be found throughout the application as originally filed including, for example, p. 3, lns. 13-14 and p. 4, lns. 8-19.

No new matter will be introduced into this application by entry of these amendments. Entry is respectfully requested.

B. Claims 1-4, 7, and 15-20 are Patentable over Araki in view of Kobayashi

Applicants respectfully traverse the rejection of claims 1-4, 7, and 15-20 under 35 U.S.C. § 103(a) as allegedly being obvious over Araki in view of Kobayashi. As set forth in detail below, Araki and Kobayashi, whether alone or in combination, do not teach, disclose, or suggest a coating composition comprising a binder resin of polyimide or polyamide-imide, solid

lubricant, a silane coupling agent, and titanium oxide powder particles. Consequently the Section 103 rejection should be withdrawn.

As noted in Applicants' June 25, 2008 and other, previous replies, Araki discloses a non-stick composite material for use in office automation equipment. [Araki, Abstract]. The non-stick composite material is produced by applying a fluorine-containing ethylenic polymer having a functional group to a substrate which Araki identifies as being office automation equipment. [see, e.g., Araki, claim 1]. This fluorine-containing ethylenic polymer having a functional group is applied to the substrate as a coating composition [Araki, claim 3] or as a film [Araki, claim 4]. Araki further discloses that the substrate may constitute a material selected from the group consisting of, *inter alia*, polyimide and polyamide imide. [Araki, claim 7]. Thus, Araki's fluorine-containing polymer and substrate are two separate substances. That is, Araki's coating composition or film does not contain polyimide or polyamide imide as contended by the Office Action. [7/16/08 Office Action, p. 3 and 9]. Rather, it is Araki's substrate onto which the coating or film is applied that contains polyimide or polyamide imide. Consequently, in contrast to the allegations set forth in the Office Action [7/16/08 Office Action, p. 10], Araki does not disclose a "coating composition comprising a binder resin, which is polyimide or polyamide-imide" as recited in Applicants' claim 1. Here, Applicants are not contesting whether Araki's composition may be applied as a coating or film, but that the makeup of Araki's coating composition is different.

Applicants note that Araki, in fact, teaches away from the inclusion of polyamide or polyamide imide in the coating composition. This is shown, for example, by col. 2, ln. 50 to col. 3, ln. 5 of Araki, the relevant portion of which states:

Use of a coating composition containing a fluorine-containing resin as a primer, in which heat resistant resins such as polyamide

imide, polyimide, polyethersulfone and polyether ether ketone and in addition, a metal powder are added instead of the above-mentioned organic acid, has been studied (JP-A-6-264000). Inherently there is almost no compatibility between a fluorine-containing resin and a heat resistant resin. Therefore there arises a phase separation in a coating film, thus easily causing intercoat adhesion failure between the primer and the top coat of the fluorine-containing resin. Further film defects such as pin holes and cracks arise easily at the time of processing at high temperature or during use due to a difference in heat shrinkage between the fluorine-containing resin and the heat resistant resin or due to lowering of elongation of the coating film by the addition of the heat resistant resin. [Araki, col. 2, lns. 50-65].

Here, Araki states that there is no compatibility between a fluorine-containing resin and one containing polyimide or polyamide imide. Araki also states that undesirable results such as adhesion failure and defects such as pinholes and cracks occur when processing such a coating composition. Consequently, Araki teaches away from the incorporation of polyimide or polyamide imide into a fluorine-containing resin.

In rejecting claim 1, the Office Action also contends that "Araki et al. disclose that the amount of the fluorine-containing polymer, may be between 5% to 70% by weight, although it generally depends on the intended coating, thickness, concentration, and viscosity of a coating composition, coating method, etc. (column 14, lines 18-22)." [7/16/08 Office Action, p. 3-4]. Applicants note, however, that col. 13, ln. 43 to col. 14, ln. 22 of Araki merely discloses that the 5 to 70% range is for the concentration of the polymer in an aqueous dispersion (e.g., in water). There is, however, no teaching, suggestion, or motivation for attaining this concentration range with respect to the binder resin as recited in Applicants' claim 1. The Office Action further contends that:

... the amounts as claimed in instant application (i.e. based on polyimide or polyamide imide) are seen to be obvious over Araki et al. or where needed, as detailed out previously, over Araki et al. in view of Kobayashi et al. [7/16/08 Office Action, p. 11].

Applicants respectfully disagree with the Office Action's conclusion. As was pointed out in Applicants' June 25, 2008 reply, Araki discloses in col. 14, lns. 45-50 that:

To the fluorine-containing powder coating composition can be added optionally additives in an amount not lowering remarkably characteristics such as heat resistance of the fluorine-containing resin. Examples of the additives are, for instance, pigments such as carbon powder, titanium oxide and cobalt oxide; ... [Araki, col. 14, lns. 45-50].

Since Araki merely indicates that titanium oxide may be included as a pigment rather than to improve the wear or seizure resistance of the composition, it would not be obvious to adjust the concentration of titanium oxide to modify these properties. The inclusion of titanium oxide in Applicants' film is to improve the wear and seizure resistance, not to change the color.

Applicants further respectfully assert that it would not have been obvious to obtain a coating composition with the constituents and concentrations as recited in claim 1 based on the combined teachings of Araki and Kobayashi. As noted in Applicants' June 25, 2008 and previous replies, Kobayashi's composition is not a coating or film nor does Kobayashi teach the use of the disclosed composition as a coating or film. Rather, Kobayashi merely discloses a highly rigid sliding part formed of a synthetic resin containing, *inter alia*, a polyamide resin, titania (titanium oxide) fibers as a reinforcement, and a fluoro resin powder to improve the sliding characteristics. Stated in other words, Kobayashi does not disclose a wear-resistant and seizure-resistant *film* containing polyimide or polyamide imide as a binder resin which is *formed on* a sliding part. As will be discussed in detail below, this distinction is significant for a number of reasons.

The Office Action states that "Isamu Kobayashi et al. disclose a composition used for sliding parts containing a thermoplastic resin such as polyamide resin, a slide improver such as a fluoro resin, and 5-50 wt.% of titania having a diameter of 0.2-1  $\mu\text{m}$  (Abstract; translation: pages

6 and 9).” [7/16/08 Office Action, p. 4]. As previously noted by Applicants, Kobayashi discloses the incorporation of titania fibers, not particles. Applicants have amended claim 1 for further clarity such that it now requires, *inter alia*, the inclusion of “titanium oxide powder particles.” This patentable distinction is significant for several reasons. First, Kobayashi’s fibers have a diameter of 0.1 to 1  $\mu\text{m}$  with lengths of 5 to 20  $\mu\text{m}$  and, hence, an aspect ratio (i.e., the ratio of the length to the diameter) of 5 or more. As such, Kobayashi’s titania fibers cannot be considered particles as required by Applicants’ claim 1.

The use of particles in powder form as opposed to fibers produces a coating composition with significantly different properties. For example, the elongated nature of Kobayashi’s titania fibers results in poor dispersability within a binder resin when compared with Applicants’ titanium oxide powder particles. In addition, as Kobayashi’s sliding part formed from fiber-containing resin gradually wears down during use, the titania fibers begin to “drop off” of the external surface of the sliding part. This results in the formation of elongated, groove-like troughs along the outer surface of the sliding part. Since the entirety of Kobayashi’s sliding part contains the titania fibers, the formation of these troughs will not cause any serious problems. However, when a coating or film is formed with titania fibers, the formation of elongated grooves on the surface of the film will significantly impact the wear and seizure resistance of the film itself. Consequently the use of fibers instead of particles in a film formed on a sliding part will not produce the desired improvements in wear and seizure resistance.

Since Kobayashi’s titania fibers will not produce the same improvements in wear and seizure resistance as would be obtained with titanium oxide powder particles, Applicants respectfully assert that there is a patentable distinction for the use of particles instead of fibers. Moreover, neither Araki or Kobayashi recognize, let alone teach the benefit of using titanium

oxide powder particles within the coating composition recited in Applicants' claim 1. As mentioned previously, Araki also teaches the undesirability of mixing polyimide or polyamide imide with a fluorine-containing resin. As such, in view of the teachings of Araki, a person of ordinary skill in the art would not be motivated to combine Kobayashi's polyamide resin with Araki's fluorine-containing resin to obtain Applicants' coating composition.

Accordingly, Araki and Kobayashi - whether alone or in combination - fail to teach disclose, or suggest a "wear resistant and seizure resistant film formed on a sliding part, wherein the film is formed of a coating composition comprising a binder resin, which is polyimide or polyamide-imide, a solid lubricant of polytetrafluoroethylene in an amount of from 15% ... to 100% by mass ..., titanium oxide powder particles in an amount of from 5% ... to 35% by mass ..., and a silane coupling agent in an amount of from 0.1% ... to 10% by mass based on 100% by mass of the binder resin, the solid lubricant, the titanium oxide powder particles and the silane coupling agent being dispersed in the binder resin of the film" as recited in Applicants' amended claim 1. Applicants submit claim 1 is patentably distinct from Araki and Kobayashi for at least this reason. Since claims 2-4, 7, and 15-19 depend either directly or indirectly from claim 1 they are asserted to be allowable for at least similar reasons. New claim 20 contain the elements recited in claim 1 and, hence, is also deemed to be in condition for allowance. Consequently, the Section 103 obviousness rejection should be withdrawn.

Applicants have chosen in the interest of expediting prosecution of this patent application to distinguish the cited documents from the pending claims as set forth above. These statements should not be regarded in any way as admissions that the cited documents are, in fact, prior art. Furthermore, Applicants have not specifically addressed the rejections of the dependent claims. Applicants respectfully submit that the independent claim from which they depend is in

condition for allowance as set forth above. Accordingly, the dependent claims also are in condition for allowance. Applicants, however, reserve the right to address such rejections of the dependent claims in the future as appropriate.

**CONCLUSION**

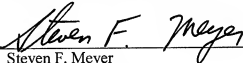
For the above-stated reasons, this application is respectfully asserted to be in condition for allowance. An early and favorable examination on the merits is earnestly solicited. In the event that a telephone conference would facilitate the examination of this application in any way, the Examiner is invited to contact the undersigned at the number provided.

THE COMMISSIONER IS HEREBY AUTHORIZED TO CHARGE ANY ADDITIONAL FEES WHICH MAY BE REQUIRED FOR THE TIMELY CONSIDERATION OF THIS AMENDMENT UNDER 37 C.F.R. §§ 1.16 AND 1.17, OR CREDIT ANY OVERPAYMENT TO DEPOSIT ACCOUNT NO. 13-4500, ORDER NO. 5000-5167.

Respectfully submitted,  
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